Attachment H

Habitat Impacts

for:

Ridge Road Extension Alternatives Analysis

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TABLE OF CONTENTS

TABLES

MAPS

Attachment H

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Potential impacts to wildlife habitat were assessed based on acreage and habitat quality. The acreage analysis is based on direct impacts, while the habitat quality analysis is based on direct plus indirect impacts.

1.0 Methodology

Potential impacts to wildlife habitat were assessed as follows:

1) Total acreage of natural habitat that would be impacted by the alternative.

   The total acreage of natural habitat that would be impacted by an alternative was created by intersecting the FLUCFCS coverage with the alignment, and the acreage of natural habitats was computed based on the area of direct impact for each alignment. The SWFWMD 2011 land use GIS layer was used as the basis of the FLUCFCS calculations. Any corrections to the FLUCFCS that were made for the wetland analyses were included for the natural habitat analysis. The area of analysis was the footprint of the alternative (direct impacts).

   Note: Acreages in the 2003 and 2011 Alternatives Analyses are not comparable as the 2011 Analysis was based on an older, raster cover type that was used to generate the habitat quality score discussed below.

2) Habitat quality or value.

   Potential habitat quality was based on recent studies by the Florida Fish and Wildlife Conservation Service (FWC). Two significant FWC Florida wildlife habitat studies (Endries et al. 2008 and 2009) have been completed since the original Ridge Road alternatives analysis was completed in 2001, and those build upon each other and upon the Cox et al. (1994) "Closing the Gaps" analysis to provide an updated and common platform from which all alternatives can be compared relative to potential impacts to wildlife habitats. Use of the Endries et al. (2008) analysis was used to evaluate potential effects of the proposed alternatives on wildlife habitats.

   GIS-readable data appropriate to analysis of wildlife habitat quality were obtained from the FWC. The 2008 and 2009 FWS studies referenced above summarize some 10 different wildlife habitat occurrences and importance classifications to produce a single GIS layer that ranks habitats (both natural and altered) in order of their importance to the maintenance of wildlife in Florida. The summary layer, titled the "Integrated Wildlife Habitat Ranking System (IWHRS)" was used to estimate the importance of each of the alternatives to wildlife. The analysis area was considered to be the area that includes the footprint (direct impacts) of the alternative plus any area within 300 feet on each side of that footprint.

   A weighted average of the IWHRS scores was computed for each alternative using the following formula:

   Wildlife Habitat Value (WHV)=sum(acreage*IWHRS value) / sum (acreage)

   The higher the value, the greater the importance of the habitats along the alternative to wildlife. The values range from 1 to 10 with 10 representing the most important wildlife habitats and 0 the least important wildlife habitats. Consequently, development of an alternative with a high WHV would impact habitat of higher value to wildlife than would occur if an impact of equal magnitude (equal

acreage of impact) to an alternative with a low WHV. These can be translated into a non-numeric scale of habitat quality that ranges from no value (such as existing roads) to very high value for totally optimal conditions per Endries et al. (2008).

WHV	0	>0 - 2	>2 - 4	>4 - 6	>6 - 8	>8
WHV score	None (N)	Very Low (VL)	Low (L)	Moderate (M)	High (H)	Very high (VH)

The acreage of impact also varies by the length of the alternative since alternatives that are shorter have less total impact. An alternative that impacts a small amount of high quality habitat likely has less impact on wildlife overall than an alternative with the same score that impacts a large amount of habitat of the same quality. To make a score that can be used to compare impacts by alternative, WHV scores were further scaled by making them proportional to the impact acreage of the alternative with the greatest impact.

IWHRS Comparative Score = WHV*acreage/impact acreage for alternative with greatest impact. The comparative scores should not be interpreted in terms of the WHVs as, except for the alternative with the greatest impact acreage, they will be lower.

2.0 Findings

Map Set H-1 shows the locations of habitats within 300 feet on both sides of each alignment along each alternative based on FLUCFCS. It also shows the limits of construction fill within which there will be direct impacts. The acreages of direct impact are summarized by FLUCFCS, in Table H-1. The direct impacts range from a high of 108.6 acres of natural habitats, including both wetlands and uplands, for Alternative 3 to a low of 0.3 acre for Alternative 11. Alternative 3 had the greatest direct impact on natural uplands (88.3 acres), and Alternative 11 had the least, 0.2 acres.

In general, alternatives that traversed large natural landscapes had greater impact than those which traversed agricultural and/or developed areas. Alternatives that were partially raised had lower impact than similarly routed alternatives where the entire alternative was at ground level. For example, Alternatives 7 and 6 had lower impact than Alternative 5. Alternative 11 had lower impact than Alternative 9.

This acreage assessment is for direct impacts only and does not take into account quality of habitat that is impacted.

Table H-1. Direct Impact Acreages by Alternative and by FLUCFCS Land Use.

	Alternative															
FLUCFCS	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
110							14.3	4.1	14.1	0.7	10.7	13.9	21.1	8.9		1.7
120	3.1	3.1	3.1	3.1	3.1	3.1	1.0	3.1	3.1	0.6	3.3	2.3	3.0	3.7	1.7	3.0
130	0.0	0.3	2.0	0.3	0.3	0.3	0.3	1.3		0.4	0.7	0.9	0.2			0.7
140	0.6	0.6	0.6	0.6	0.6	0.6	1.9	6.2	1.4	3.8	3.9	4.3	2.1	1.5	0.6	3.6
150							1.3	1.6	4.1		3.2	1.8	4.0	2.8		0.5
170								0.2			0.1	0.1		0.7		0.1
190	19.8		2.5				8.1	5.5	1.1	1.4	3.8	8.9	6.6			3.0
200									0.2							
210	61.0	63.8	65.4	62.5	55.0	61.0	14.3	5.2	117.2	1.4	76.4	14.0	86.1	105.3	31.0	33.2
250								0.4			0.1	0.1				0.1
260							1.3	0.2	1.3		1.1	1.3	2.2	1.0		0.1
310	1.3	1.3	1.3	1.3										0.6	0.6	0.6
320	18.1	25.6	21.1	25.6	11.2	20.4	0.1	0.2			0.1	0.1	0.0	13.7	13.7	13.8
330	8.8	8.8	8.8	8.8	1.7	8.4	0.1	1.1	3.1	0.2	2.0	0.1	2.0	6.1	4.2	4.2
410																
411	39.9	39.2	38.8	31.2	20.7	27.1	4.0		15.3		10.1	3.4	13.4	26.4	16.4	16.4
412	9.2	9.2	9.2	16.8	16.8	16.8	0.4					0.2	0.2	10.9	10.9	10.9
420							2.0					1.3	1.3			
434	10.1	4.3	8.5	3.7	1.4	1.5	2.7	0.0				1.8	1.8	2.5	2.5	2.5
440	9.5	14.7	8.3	15.0	15.0	15.0	1.2		1.3		1.0	0.8	1.8	8.7	7.7	7.7
520			0.3						0.4		0.2		0.2	0.2		
530	1.2	0.3	1.2	0.3	0.3	0.3		2.2	1.8	0.8	2.4	0.9	1.5	1.7	0.2	1.0
610					1.9			0.0			0.0					0.0
615	0.0	1.9	0.0	1.9		1.9	0.6		2.0		1.1	0.2	1.3	2.0	0.9	0.9
620	0.1	0.7	1.9	0.7	0.7	0.7			0.2		0.1		0.1	0.4	0.4	0.4
621	11.3	11.1	11.0	10.7	6.9	6.9	1.7	0.5	12.0	0.1	6.6	0.9	7.4	11.5	5.0	5.1

Alternative																
FLUCFCS	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
625	0.7	0.7	0.7	0.7	0.0									0.4	0.4	0.4
630	6.9	6.9	6.9	7.7	7.7	7.7		0.1	0.7	0.1	0.4	0.0	0.4	4.1	3.7	3.7
641	2.3	5.7	4.3	5.9	4.4	4.4	0.0	0.1	5.1	0.0	3.7	0.0	3.7	6.6	2.9	2.9
643	0.3	0.2	1.6	0.2	0.2	0.2	0.3	0.4	1.8		1.3	0.2	1.2	1.3	0.2	0.3
653			0.6													
800[4]	2.1	2.01	2.01	2.01	2.01	2.01	82.6	263.7	1.7	66.3	182.3	250.1	70.0	2.1	1.0	182.2
Wetlands[1]	**21.6**	**27.1**	**27.2**	**27.9**	**21.8**	**21.8**	**2.6**	**1.5**	**22.2**	**0.2**	**13.4**	**1.4**	**14.3**	**26.5**	**13.4**	**13.7**
Natural Uplands[2]	**87.3**	**88.3**	**87.6**	**87.3**	**51.8**	**74.2**	**9.2**	**1.2**	**18.4**	**0.2**	**12.2**	**6.9**	**18.8**	**60.3**	**48.3**	**48.4**
Natural Total[3]	**108.9**	**115.5**	**114.8**	**115.2**	**73.6**	**96.0**	**11.8**	**2.4**	**40.6**	**0.4**	**25.6**	**8.3**	**33.1**	**86.8**	**61.7**	**62.1**

Note:

All acreages are rounded to one decimal place, so rounded totals may differ slightly from the sum of rounded individual acreages.

[1]Wetlands – All 600 series (wetland) FLUCFCS codes plus FLUCFCS 520 (lakes)

[2]Natural Uplands – all 300 FLUCFCS series (upland non-forested with natural vegetation) and all 400 FLUCFCS (upland forested) series except 440 (pine plantation)

[3]Natural Total – the total of the Wetland and Natural Upland acreages

[4]800 – FLUCFCS series that represent transportation and utility uses including roads, utility lines, borrow ponds, spoil areas, and other infrastructure

Most natural land managers and ecologists do not use the FLUCFCS classification system. Instead, they assess lands based on natural community types and their disturbance and successional states. These relate closely to wildlife usage, with wildlife usage generally being high for natural communities that are managed with appropriate fire regimes and which are not highly fire suppressed. For clarification purposes, Table H-2 provides groupings of FLUCFCS codes as they correspond to natural communities in central Pasco County. That said, the table below is based on our knowledge of topography, soils, land use history, land management, and hydrology; and, the correspondence between the FLUCFCS mapping and natural communities is good, though not always unique. Multiple FLUCFCS codes usually correspond to single natural community types at various stages of succession and with varying disturbance regimes, but FLUCFCS codes can be associated with more than one natural community. In the table, the FLUCFCS code associated with the most "typical" natural community state is listed first. A commonly used natural community name is provided. Agricultural lands are included on this list as many of them provide important habitat to wildlife, with value depending on management.

Table H-2. FLUCFCS Relationship to Natural Communities and Habitat Value (only FLUCFCS codes mapped along the alternative are included in this table)

FLUCFCS	Description
110 – 190, 800	Urban and built up areas, transportation, and utilities. These provide little value to most wildlife and often cause barriers to wildlife movement.
200-260, 441, 320	Agricultural lands. In this area, mostly pasture and pine plantations. Value to wildlife depends on the land manager.
411, 320, 330, 410	*Pine flatwoods*. The 410 code relate to areas of fire exclusion, and the 320 and 330 codes have various combinations of logging, grazing, and fire that have reduced the canopy to less than 10% cover. We are aware of some areas of historic flatwoods that are now mapped as 434 due to long term fire exclusion.
412, 420	*Sandhill*. Most sandhill in the area has a high component of hardwoods. Where fire suppression has been long term, some has become dominated by oaks and may be classified as scrub or mixed pine-hardwood forest. . We are aware of some areas of historic sandhill that are now mapped as 434 due to long term fire exclusion.
420	*Scrub*. Most scrub in the area is oak scrub though some sand pine can be present, and some were sand pine scrub prior to recent land management. We are aware of some areas of historic scrub that are now mapped as 434 due to long term fire exclusion.
434	*Hardwood hammock.* As found in this area, most areas that received this classification originate as fire suppressed and overgrown flatwoods, sandhill, and scrub. These communities are generally dense and often lack herbaceous groundcover resulting in relatively low value to most wildlife, though many are used as refuges from open sun.
520, 653, 530	*Lakes, ponds, and reservoirs*.
615	*Stream and lake swamps* (bottomland). Water fluctuations cause habitat usage to vary with rainfall. Many are movement corridors for species such as bear and raccoon.
621, 610, 625, 630	*Dome swamps*, mostly cypress domes. Some may be dominated by swamp tupelo (often due to logging) or have picked up large numbers of hardwoods and/or palms due to long term changes in hydrology (dewatering). Habitat value varies with hydrology with dehydrated wetland losing their value for some wildlife, such as nesting wading birds. Many are critical to amphibian reproduction.
643, 310, 620	*Wet prairies*. Areas mapped as 310 also occur as openings in flatwoods and grazed areas near wetlands. Jurisdictional status for 310 requires field determination. In this area, 620 (wet flatwoods) is often a result of fire exclusion in wet prairie.
641, 653	*Marshes*, sometimes deep. These are important habitats for amphibians, small fish, foraging birds, nesting sandhill cranes, and other species. Mapping may change with hydrology (a dry marsh may be mapped as wet prairie, and the same marsh may be mapped as a lake during a very wet period).

Table H-3 provides the alternatives and results of the habitat quality analyses using the Endries et al (2009) analysis. Map set H-2 shows the quality scores along each alternative including the area within 300 feet of the alternative. The score combines distribution and occurrence of species, wildlife usage, species richness, connectivity, distance to managed lands, development patterns, existing protection status, and land cover to build an estimate of importance to wildlife (the WHV).

The WHV provides an assessment of quality of habitat along each alternative. Most of the alternatives that pass through large areas of natural habitats received moderate ("M") scores. This was true irrespective of whether or not the alternative included a single route or whether it included two routes only one of which went through natural habitats. The routes with low ("L") scores traversed only areas that are predominantly developed or a mix of development and agricultural land.

When comparing alternatives, both habitat quality, and habitat quantity are important. The Comparative Score considers both. An alternative with only a small amount of habitat receives a lower score than an alternative with the same quality of habitat but more of it. Care should be taken not to over-interpret these scores given the quality of data available.

Table H-3. Habitat Quality Scores.

Alternative	WHV Score	Comparative Score
2	M	3.4
3	M	3.3
4	M	3.3
5	M	3.4
6	M	2.3
7	M	2.9
8	L	1.4
9	L	2.0
10	L	1.8
11	L	0.5
12	L	2.6
13	L	2.4
14	L	2.4
15	M	3.0
16	M	1.8
17	L	3.1

Key: N – No impact, VL – Very Low impact, L – Low impact, M – Moderate impact, H – High impact, VH – Very High impact

Overall, the state-wide data published by the FWC (Endries et al. 2008) suggest that all of the RRE alternatives lay in a region that is generally intermediate in value (WHV of "M") compared to the state as a whole. The alternatives with Low ("L" values) are those that are either widening or elevating existing roadways such that there are very few impacts to natural habitats.
The comparative scores show the lowest value to be associated with constructing a fully elevated roadway (Alternative 11) above the existing SR 54 (score of 0.5).

The alternative with the highest quality are associated with routes (Alternatives 2-7 and 15-16) that go through areas of mostly moderate quality habitat. The comparative score was lower for alternatives through the same habitats but which reduced the acreage of impact through roadway design, or which had narrower (2-lane) roadways through that habitat and a second roadway that widened an existing road. This comparative score was lowest for Alternative 16.

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